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EXAMINER

KRISHNAN, GANAPATHY

ART UNIT	PAPER NUMBER
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1623

NOTIFICATION DATE	DELIVERY MODE
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ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No. 10/528,993	Applicant(s) MIKKONEN ET AL.	
	Examiner Ganapathy Krishnan	Art Unit 1623	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 March 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☒ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>06/05/03/05</u> | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

Claims 5 and 8 are objected to because of the following informalities: In claim 5, last line, do applicants intend 'grapeseed oil'? In claim 8 the terms 'cellulose ether' have been recited twice. Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

Claim 15-16 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a method of preparation of a hydrophobic polysaccharide dispersion, does not reasonably provide enablement for the preparation of a dispersion using any biopolymer in general. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

A conclusion of lack of enablement means that, based on the evidence regarding each of the factors below, the specification, at the time the application was filed, would not have taught one skilled in the art how to make and/or use the full scope of the claimed invention without undue experimentation.

- (A) The breadth of the claims
- (B) The state of the prior art

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- (C) The level of one of ordinary skill
- (D) The level of predictability in the art
- (E) The amount of direction provided by the inventor
- (F) The existence of working examples
- (G) The quantity of experimentation needed to make or use the invention based on the content of the disclosure.

The breadth of the claims

Claim 15 is drawn to a method of preparation of a hydrophobic polymer dispersion wherein the starting material is a biopolymer. The term biopolymer is very broad and is seen to include polymers like proteins, DNA, etc. and is also seen to reasonably include any others unknown at the time of filing of the instant claims.

The state of the prior art

The examiner notes that the art cited by the applicants (Yoshioka et al, Mol. Cryst. And Liq. Cryst., 2000, 353, 59-73) teaches the preparation of compositions comprising polysaccharides (cellulose) and plasticizers. However these compounds are structurally different from some biopolymers like proteins and DNA and are not correlative for the claimed process.

The level of predictability in the art

There is not seen sufficient data to substantiate the preparation of the dispersions as instantly claimed using all biopolymers, which includes biopolymers like proteins, etc., since not all biopolymers may be compatible and biopolymers like proteins may denature on mixing with other agents like plasticizers and dispersion agents and also due to elevated temperatures. This makes the instant method highly unpredictable for the preparation of the dispersion as instantly claimed.

The amount of direction provided by the inventor

The instant specification is not seen to provide enough guidance that would allow a skilled artisan to extrapolate from the disclosure and the examples provided to enable the preparation of the dispersion using any biopolymer. The specification does not provide a definition of a biopolymer. The polymers referred to in the specification are starch and cellulose only. The ordinary dictionary meaning of the term biopolymer is a polymer found in biological systems like proteins and DNA (The American Heritage Dictionary, 4th Edition, 2000). Even though some polysaccharides are found in living systems, the term biopolymer is not seen to be limited only to polysaccharides.

The existence of working examples

The working examples set forth in the instant specification are drawn to compositions comprising esters of starch and cellulose. Despite these examples there is little enabling disclosure for dispersion comprising biopolymers encompassed by the general dictionary meaning. Cellulose and starch are not representative of all biopolymers. Applicant has given working examples using cellulose and starch only and is therefore not entitled to claim compositions and method of preparation comprising any biopolymer.

The quantity of experimentation needed to make or use the invention based on the content of the disclosure

Indeed, in view of the information set forth, the instant disclosure is not seen to be sufficient to enable the method of preparing a hydrophobic polymer dispersion as instantly claimed. One of ordinary skill in the art would have to carry out the process in

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order to determine which among the myriad of polymers that are encompassed by the term biopolymer, is suitable for use in the method as instantly claimed. Undue experimentation is seen as necessary in the instant method.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-16 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 1 recites a hydrophobic polysaccharide that is dispersed or dissolved in solution and a plasticizing composition of the same polysaccharide. The recitation is not clear. For the purpose of prosecution the claim is examined as a composition comprising a hydrophobic polysaccharide dispersed or dissolved in a liquid phase and comprising at least 10% by weight of alkenyl succinic anhydride as the plasticizer.

Claim 7 is drawn to the solution of parent claim 1 wherein the second plasticizing component is present 0-90% by weight. If the percentage of the second plasticizing component is 0% then the whole composition is same as that recited in parent claim 1, in which case claim 7 is not further limiting. It is not clear what applicants intend.

Regarding claim 8, the phrase "such as" renders the claim indefinite because it is unclear whether the limitations following the phrase are part of the claimed invention. See MPEP § 2173.05(d).

Claim 13 recites the term derivatives. In the absence of the specific derivatizations to the chemical core claimed or distinct language to describe the structural modifications or the chemical names of the derivatives of this invention, the identity of said derivatives would be difficult to describe and the metes and bounds of the said derivatives applicants regard as the invention cannot be sufficiently determined because they have not been particularly pointed out or distinctly articulated. The specification refers to esters and ethers of starch and cellulose as examples of derivatives. Since the claim is drawn to a polysaccharide in general it is not clear if applicants intend only esters and ethers.

Claim 15, step (a) recites the terms, 'dispersion admixtures'. Do applicants intend a mixture of dispersion agents? Step (b) recites paste-like composition. It is not clear what paste-like means.

The term "elevated" in claim 16 is a relative term which renders the claim indefinite. The term "elevated" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention.

Claims that depend from a rejected base claim that is unclear/indefinite are also rendered unclear/indefinite and are rejected for the same reasons.

Double Patenting

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. A nonstatutory obviousness-type double patenting rejection is appropriate where the conflicting claims are not identical, but at least one examined application claim is not patentably distinct from the reference claim(s) because the examined

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application claim is either anticipated by, or would have been obvious over, the reference claim(s). See, e.g., *In re Berg*, 140 F.3d 1428, 46 USPQ2d 1226 (Fed. Cir. 1998); *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) or 1.321(d) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent either is shown to be commonly owned with this application, or claims an invention made as a result of activities undertaken within the scope of a joint research agreement.

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

Claims 15-16 are rejected on the ground of nonstatutory obviousness-type double patenting as being unpatentable over claims 1-2 and 19 of U.S. Patent No. 6,780,903 ('903).

Although the conflicting claims are not identical, they are not patentably distinct from each other because:

Instant Claim 1 is drawn to a method of preparing a hydrophobic polymer comprising mixing a biopolymer, plasticizing agent, dispersion admixtures and water, heating the mixture and diluting the paste-like composition obtained with water, wherein the plasticizing agent is at least 10% by weight and is an alkenyl succinic anhydride.. Dependent claim 16 recites limitations drawn to conducting steps (a) and (b) simultaneously at an elevated temperature.

Claims 1-2 of '903 are drawn to a method of hydrophobic polymer comprising the same steps. Claim 19 of '903 is drawn to the types of plasticizers.

Claims 1-2 and 19 of '903 differ from the instant claims in that the instant claims employ a biopolymer and alkenyl succinic anhydride as the plasticizer. However, it would have been

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obvious to one of ordinary skill in the art at the time the invention was made that any plasticizer and biopolymer could be successfully employed in the method of '903 and vice versa.

In determining the differences between the prior art and the claims, the question is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. Obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either explicitly or implicitly in the references themselves or in the knowledge generally available to one of ordinary skill in the art. "The test for an implicit showing is what the combined teachings, knowledge of one of ordinary skill in the art, and the nature of the problem to be solved as a whole would have suggested to those of ordinary skill in the art." *In re Kotzab*, 217 F.3d 1365, 1370, 55 USPQ2d 1313, 1317 (Fed. Cir. 2000). In the instant case, '903 teaches performing each of the steps applicant claims. Although the claims of '903 employ a biopolymer which may not be hydrophobic and closely related plasticizers like dialkyl succinates, one of ordinary skill in the art would readily recognize that the scheme taught by '903 could be employed in the instant method too. The use of known members of classes of reagents in reactions to effectuate the same type of modifications taught in the prior art is not seen to render the instantly claimed method unobvious over the art. Once the general reaction has been shown to be old, the burden is on the applicant to present reason or authority for believing that a closely related starting compound or a closely related plasticizer would take part in or affect the basic reaction and thus alter the nature of the product or the operability of the process and thus the unobviousness of the method of producing it.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hassmaa et al (WO 97/49762) in view of Yoshioka et al (Mol. Cryst. and Liq. Cryst. 2000, 353, 59-73), both documents cited in the IDS filed 3/24/2005.

Hassmaa et al, drawn to hydrophobic polymer dispersions, teach such dispersions comprising starch esters, plasticizer. Starch esters, including cationized starch can be used in the dispersion (page 4, line 30 through page 5, line 2). The percentage of the components can also be varied over a wide range page 28, line 1 through page 29, line 25). Several other plasticizers including alkyl succinates castor oil, olive oil, rapeseed oil, tall oil, etc., as instantly claimed can be used (page 29, lines 10-15). Example 5 at page 12 teaches a method of making the dispersion wherein starch acetate (polysaccharide polymer) triacetin (the plasticizing agent) , cationized starch mixture is first melted to get a paste and this then dissolved in water at elevated temperature to obtain a dispersion. Example 4 at page 11 teaches the use of admixtures. However, Hassmaa does not teach a dispersion or solution wherein the plasticizing agent is alkenyl succinic anhydride.

Yoshioka et al, drawn to plastics, teach compositions comprising cellulose diacetate (a polysaccharide ester as in claim 1 and claim 8) and succinic anhydride (plasticizer). The composition obtained is shown in Fig, 1, at page 63. According to Yoshioka the composition obtained by plasticizing cellulose diacetate with succinic anhydride gave a product that had very interesting mechanical properties as well (page 64, second paragraph below figure). The compositions obtained using succinic anhydride were also biodegradable (page 68, first paragraph). However, Yoshioka does not teach a composition wherein alkenyl succinic anhydride is used as the plasticizer.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make compositions as instantly claimed via the method as instantly claimed since

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such compositions comprising polysaccharide polymers and closely analogous plasticizers and the method of making them using similar process steps is seen to be taught in the prior art.

One of skill in the art would be motivated to make the compositions using alkenyl succinic anhydride as instantly claimed since such compositions are biodegradable and hence environmental friendly (Hassmaa, page 1, line 5 through page 2, line 7). The use of biodegradable components like starch and cellulose avoids the need for using organic solvents and instead water (readily available and cheap) can be used. The compositions have a wide variety of uses (Hassmaa page 3 through page 4, line 12). In addition to hydrophobicity, the use of succinic anhydride, according to Yoshioka, gives compositions having interesting mechanical properties. Hence one of skill in the art would want to substitute the succinic anhydride with alkenyl substituted anhydride in order to look for compositions with better water repellent and mechanical properties. It is well within the skill level of the artisan to adjust the percentages of the components in order to optimize the desired properties of the products. The substitution of various alkyl and alkenyl groups is also well known to one of skill in the art, especially the hydrophobicity of such groups. Given the good water repellent properties of analogous compositions one of skill in the art would use these substituents in order to look for products with better water repellent properties.

Claim 1-16 are rejected under 35 U.S.C. 103(a) as being obvious over Peltonen et al (US 6,780,903).

The applied reference has a common inventor and assignee with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art only

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under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 103(a) might be overcome by: (1) a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not an invention “by another”; (2) a showing of a date of invention for the claimed subject matter of the application which corresponds to subject matter disclosed but not claimed in the reference, prior to the effective U.S. filing date of the reference under 37 CFR 1.131; or (3) an oath or declaration under 37 CFR 1.130 stating that the application and reference are currently owned by the same party and that the inventor named in the application is the prior inventor under 35 U.S.C. 104, together with a terminal disclaimer in accordance with 37 CFR 1.321(c). This rejection might also be overcome by showing that the reference is disqualified under 35 U.S.C. 103(c) as prior art in a rejection under 35 U.S.C. 103(a). See MPEP § 706.02(l)(1) and § 706.02(l)(2).

Peltonen et al, drawn to hydrophobic polymer dispersions, teach such dispersions comprising starch esters, cellulose esters and plasticizer col. 1, line 49 through col. 2, line 10; col. 4, line 1 through col. 5, line 3). The percentage of the components can also be varied over a wide range (col. 5, lines 38-56). Several other plasticizers including alkyl succinates castor oil, olive oil, rapeseed oil, tall oil, etc., as instantly claimed can be used (col. 5, lines 4-14). Examples 2-3 (cols. 6-7) teach a method of making the dispersion wherein starch and cellulose acetate (polysaccharide polymer) triacetin (the plasticizing agent) are first melted to get a paste and this then dissolved in water at elevated temperature to obtain a dispersion. However, Peltonen does not exemplify a dispersion or solution wherein the plasticizing agent is alkenyl succinic anhydride.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make compositions as instantly claimed via the method as instantly claimed since such compositions comprising polysaccharide polymers and closely analogous plasticizers and the method of making them using similar process steps is seen to be taught in the prior art.

One of skill in the art would be motivated to make the compositions using alkenyl succinic anhydride as instantly claimed since such compositions are biodegradable and hence are environmental friendly (Peltonen, col. 1, lines 50-53). The use of biodegradable components like starch and cellulose avoids the need for using organic solvents and instead water (readily available and cheap) can be used. The compositions have a wide variety of uses (Col. 2, lines 11-46). Hence one of skill in the art would want to substitute the triacetin taught in the prior art with alkenyl substituted succinic anhydride in order to look for compositions with better water repellent and mechanical properties. It is well within the skill level of the artisan to adjust the percentages of the components in order to optimize the desired properties of the products. The substitution of various alkyl and alkenyl groups is also well known to one of skill in the art, especially the given the hydrophobicity of such groups. Given the good water repellent properties of analogous compositions one of skill in the art would use these as substituents in the closely related succinic anhydrides (the corresponding succinates are taught in the prior art) order to look for products with better water repellent properties.

Conclusion

Claims 1-16 are rejected

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ganapathy Krishnan whose telephone number is 571-272-0654. The examiner can normally be reached on 8.30am-5pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shaojia A. Jiang can be reached on 571-272-0627. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

GK

/Shaojia Anna Jiang, Ph.D./

Supervisory Patent Examiner, Art Unit 1623